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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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09/696,863

10/25/2000

Shunpei Yamazaki

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2608

7590

11/25/2002

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EXAMINER

WELLS, NIKITA

ART UNIT

PAPER NUMBER

2881

DATE MAILED: 11/25/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/696,863

Applicant(s)

YAMAZAKI ET AL.

Examiner

Nikita Wells

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 18 July 2002 and 18 September 2002.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-10 and 12-45 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-10 and 12-45 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 25 October 2000 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☒ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____
- 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

DETAILED ACTION

Response to Amendments

1. The Applicant filed an "Amendment" received July 18, 2002, where he canceled claim 11, amended claims 1, 7, 10, 12, and 18, added additional claims 21-37, and provided arguments that the references of Yamazaki et al. (6,165,876) in view of King et al. are not applicable to the Applicant's invention. The Applicant subsequently filed a "Supplemental Amendment" received September 18, 2002, where he added additional claims 38-45.

Applicant's arguments with respect to the independent claims 1, 7, 10, 12, 18, and the newly added independent claims 21, 25, 29, 32, 35, 38, 40, 42, and 44 as filed in the above "Amendments" have been fully considered but they were found not persuasive.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. Claims 1-10 and 12-20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yamazaki et al. (6,165,876) in view of King et al. (5,760,405) for reasons given in the First Office Action (Paper No. 5).

With respect to the independent claims 1, 7, 10, 12, 18, the Applicant argues that both Yamazaki et al. and King et al. fail to disclose a magnet for separating the extracted ions on a

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mass basis. The ions are separated by the magnet after the ions have been extracted by the extraction electrodes. However, the Examiner does not find this argument persuasive since the separation of the ions for mass analysis with a magnet after the ions have been extracted by the extraction electrode is well known in prior art (for example see Keller et al. (5,206,516) as shown below). In fact it is referred to by King et al. (see Col. 2, lines 31-40). Therefore, the rejections as stated in the previous Office Action stands firm.

4. Claims 21-45 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yamazaki et al. (6,165,876) in view of Aitken et al. (5,389,793).

With respect to the claims 21, 25, 29, 32, and 35, Yamazaki et al. disclose (Abstract; Figs. 5 and 9; Col.6, lines 37-45; Col.11, lines 31-41) an ion doping apparatus comprising: a gas source for introducing a dopant gas and a second gas for diluting the dopant gas into a chamber; a power source for generating a plasma of the dopant gas and the second gas; a extraction electrode for extracting and accelerating ions of the dopant gas and the second gas toward the substrate.

With respect to the claims 22, 26, 30, 33, and 36, Yamazaki et al. disclose, besides the ion doping apparatus as mentioned above, a laser irradiation means (Col.12, lines 48-57) for irradiating the substrate with a laser beam while moving the substrate in a direction orthogonal to the flow of the ions.

Yamazaki et al. fail to disclose a magnet for separating the extracted ions on a mass basis; a slit for cutting a first portion of the ions separated by the magnet while allowing a second portion of the ions to pass through the slit; a substrate to be subjected to a flow of the second

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portion of the ions wherein the flow of the second portion of the ions has a cross section at the substrate, the cross section being elongated in one direction, and moving means for moving the substrate in an orthogonal direction to the elongation direction of the cross section. Yamazaki et al. also fail to disclose a magnetic field which is substantially in parallel with an elongation direction of the cross section of the beam with the magnetic field strength being in a range of from 0.1 to 10 tesla, and the moving means for moving the substrate in an orthogonal direction to the elongation direction of the cross section.

However, with respect to the claims 21, 23, 25, 27, 29, 32, and 35, Aitken et al. disclose (Abstract; Figs. 5, 7, and 26; Col. 4 lines 33-45; Col. 5 lines 14-26; Col. 24, line 65 to Col. 25, line 18) a magnet for separating the extracted ions on a mass basis; a slit for cutting a first portion of the ions separated by the magnet while allowing a second portion of the ions to pass through the slit; a substrate to be subjected to a flow of the second portion of the ions, wherein the cross section is elongated in one direction, and moving means for moving the substrate in an orthogonal direction to the elongation direction of the cross section.

It would have been obvious to a person of ordinary skill in the art at the time the invention was made to recognize and substitute the ion implantor of Aitken et al. into the ion doping apparatus of Yamazaki et al. in order to reduce the number of doping steps required and reduce contamination of the substrate.

With respect to the claims 24, 28, 31, 34, and 37, the fact that the magnetic field strength of the magnet is in a range of from 0.1 to 10 tesla is a matter of obvious design choice because this is a normal range of magnetic field strength that is found in prior art in ion implanters and ion deposition apparatus.

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With respect to claims 23 and 27, Aitken et al. disclose (Fig. 26, Col. 26 lines 25-29) that the magnetic field is generated by coils.

With respect to the newly added claims 38-45, Aitken et al. disclose (Figs. 5, 7, 17, 18, and 24; Col. 5 lines 14-26; Col. 17, line 60 to Col. 18, line 2; and Col. 22, lines 27-32) that the ion beam generated has an elongated cross section, a means is provided to focus and mass analyze the ion beam with a slit for cutting portion of the beam, a stage that moves the substrate across the beam, and means for irradiating the beam onto a substrate in a direction oblique to the surface of the substrate.

Conclusion

4. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the mailing date of this final action.


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4. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Nikita Wells whose telephone number is (703) 305-0416. The examiner can normally be reached 8:30 AM - 5:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, John R. Lee can be reached on (703) 308-4116. The fax phone number for the organization where this application or proceeding is assigned is (703) 305-3230. Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.

Nikita Wells

November 18, 2002


BRUCE ANDERSON
PRIMARY EXAMINER